APPENDIX I

PRELIMINARY RISK ASSESSMENT

Technical Memorandum

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To: Range 24 Lower, Parcel 81Q, Fort McClellan, Calhoun County, Alabama
Preliminary Risk Assessment File

Date: 11 February 2002

Subject: **PRELIMINARY RISK ASSESSMENT FOR SUBJECT SITE**

This memorandum provides a Preliminary Risk Assessment (PRA) for exposure to surface soil, subsurface soil, groundwater, surface water, and sediment at the Range 24 Lower, Parcel 81Q, herein referred to as Parcel 81Q. The PRA approach is a shortened version of the Streamlined Risk Assessment (SRA) protocol developed as a uniform and economical approach to evaluating hundreds of similar sites at Fort McClellan (FTMC). It is assumed that the reader is familiar with FTMC and the fundamentals of the SRA protocol. The reader is referred to the Installation-Wide Work Plan (IT, 1998) for more detail. All the comparison and computational operations of the PRA are performed within EXCEL® spread sheet tables. The results of each step are described below.

Media of Interest and Data Selection. Media of interest are surface soil, subsurface soil, groundwater, surface water, and sediment. Data consist of 6 surface soil samples combined with 2 depositional soil samples, 6 subsurface soil samples, 3 groundwater samples (2 wells were installed; the third sample was taken from an existing well that had at one time been used as a background well), 1 surface water sample, and 1 sediment sample. All samples were analyzed for metals and nitroaromatic explosives. The validated data are summarized in the SI Report (IT, 2002).

Site-Related Chemical Selection. Site-related chemicals are those presumed to be released because of activities performed by the Army during operation of FTMC. They are identified in Tables 1 and 2 (surface soil), Tables 3 and 4 (subsurface soil), Table 5 (groundwater), Table 6 (surface water), and Table 7 (sediment) by comparing the maximum detected concentration (MDC) of each chemical with its background screening criterion (BSC), computed as two times the mean of the background data set, in accordance with EPA (2001) Region IV guidance. BSCs

were taken from tables of the SI Report (IT, 2002). Upper tolerance limits (UTL), the highest metal concentrations reasonably considered to be within background, are also included in Tables 1 through 7 for information, but were not used to select site-related chemicals. The UTL provides a more refined statistical approach than the BSC for comparing site and background data. UTLs were developed for the entire FTMC facility, combining data from the Main Post and Pelham Range.

Chemical of Potential Concern Selection. Chemicals of potential concern (COPC) are site-related chemicals whose MDCs exceed their site-specific screening levels (SSSL), and which may contribute significantly to risk. The SSSLs are receptor-, medium-, and chemical-specific risk-based concentrations that capture all the exposure assumptions and toxicity assessment of a full-blown baseline risk assessment. COPCs are selected for both cancer risk and non-cancer effects when the data permit (Tables 1 through 7).

Receptor Scenario Selection. The proposed land reuse plan states that the site will be used for passive recreation. The most plausible receptor is a recreational site user. An on-site resident is also included as the upper-bound evaluation of exposure and risk, and to provide additional perspective. SSSLs for both receptor scenarios were used to select COPCs for surface and subsurface soil. The resident, but not the recreational site user, is assumed to be exposed to groundwater; therefore, only residential SSSLs were used for COPC selection for groundwater. The assumptions for residential and recreational site user exposure to surface water and sediment are identical; therefore, only the recreational site user SSSLs were used for COPC selection for surface water and sediment.

Risk Characterization. Risk characterization combines the exposure assumptions and toxicity assessment (incorporated in the SSSLs) with the exposure-point concentration (EPC) to quantify the incremental lifetime cancer risk (ILCR) and non-cancer hazard index (HI). ILCR and HI estimates are computed for each chemical in each medium, and are summed to yield a total ILCR and total HI for each receptor scenario. The PRA differs from an SRA in that no attempt is made to estimate an EPC that reflects a conservative estimate of average concentration for use in risk assessment. The 95 percent upper confidence limit on the mean (UCL) is usually used for this purpose. For this evaluation, the MDC is adopted as the EPC, which imparts a conservative bias to the PRA.

EPA (1990) considers ILCR estimates below 1E-6 to be negligible, ILCR estimates from 1E-6 to 1E-4 to fall within a risk management range, and ILCR estimates above 1E-4 to be generally

unacceptable. EPA (1989) states that risk values should be rounded to one significant figure to reflect the uncertainty about their estimation. For example, a calculated ILCR of 9.50E-7 would be rounded to 1E-6 and interpreted as falling within the risk management range. Similarly, a calculated ILCR of 1.49E-4 would be rounded to 1E-4 and interpreted as falling within, but not exceeding, the risk management range. Also, an HI of 1.49E+0 would be rounded to 1 and interpreted as not exceeding the threshold level of 1. Risk estimates in this document are presented in scientific notation with two places to the right of the decimal. Rounding is done only if needed to facilitate interpretation.

The only plausible receptor scenario for soil, surface water and sediment at Parcel 81Q is the recreational site user. No chemicals were selected as COPCs for recreational site user exposure to surface soil (Table 1), subsurface soil (Table 3), surface water (Table 6), or sediment (Table 7); therefore, neither an ILCR nor an HI were estimated for this receptor. It is concluded that recreational site user exposure to surface soil, subsurface soil, surface water and sediment at Parcel 81Q is unlikely to result in unacceptable cancer risk or adverse non-cancer health effects.

The on-site resident was also evaluated as the upper-bound on exposure and risk and to provide additional perspective. No COPCs were selected for residential exposure to surface soil (Table 2), or subsurface soil (Table 4).

No chemicals were selected as cancer-based COPCs for residential exposure to groundwater; therefore, no ILCR was estimated. Non-cancer COPCs for residential exposure to groundwater include aluminum, chromium, and manganese. The total HI for exposure to groundwater of 2.26E+0 exceeds the threshold value of 1. The MDC for aluminum and manganese falls below the UTL and is within the range of background (data not shown) (SAIC, 1998). It is judged that aluminum and manganese reflect background conditions in groundwater and are not site-related. Chromium was not detected in background and so is considered site-related. With chromium as the only site-related COPC in groundwater, the total HI for site-related COPCs is 2.19E-1 which is below the threshold value of 1.

The resident theoretically could be exposed to surface soil, subsurface soil, groundwater, surface water, and sediment. As noted above, residential exposure to surface water and sediment would be identical to that of the recreational site user. COPCs were not selected in surface water or sediment for the recreational site user, nor were any COPCs selected for the resident in surface soil or subsurface soil; therefore, these media are not considered further in the residential evaluation. The total HI from groundwater of 2.19E-1 is below the threshold value of 1. It is

concluded that exposure to surface soil, subsurface soil, groundwater, surface water and sediment poses no unacceptable risk for the resident.

References

IT Corporation (IT), 1998, ***Installation-Wide Work Plan***, Final, Fort McClellan, Calhoun County, Alabama, Prepared for U.S. Army Corps of Engineers, Mobile District, August*

IT Corporation (IT), 2002, ***Site Investigation Report, Parcel 81Q,*** Fort McClellan, Calhoun County, Alabama, Prepared for U.S. Army Corps of Engineers, Mobile District, March.

Science Applications International Corporation (SAIC), 1998, ***Final Background Metals Survey Report***, prepared for U.S. Army Corps of Engineers, Mobile District, July.

U.S. Environmental Protection Agency (EPA), 1989, ***Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A)***, Interim Final, Office of Emergency and Remedial Response, Washington, DC, EPA/540/1-89/002, December.

U.S. Environmental Protection Agency (EPA), 1990, "National Oil and Hazardous Substances Pollution Contingency Plan," ***Federal Register*** 55(46): 8666-8865.

U.S. Environmental Protection Agency (EPA), 2001, ***Region 4 Human Health Risk Assessment Bulletins – Supplement to RAGS, Interim Human Health Risk Assessment Bulletins***, Waste Management Division, EPA Region 4, Atlanta, Georgia, on line.

*Note: the Installation-Wide Work Plan is undergoing revision and has not yet been released for distribution. The description of the protocol and application of the SRA, however, was not substantively changed.

Table 1

Preliminary Risk Evaluation for Recreational Site User Exposure to Surface Soil
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Recreational Site-User Soil SSSL-c[b]	Recreational Site-User Soil SSSL-n[c]	Recreational Site-User Cancer COPC?[d]	Recreational Site-User Noncancer COPC?[e]	Recreational Site-User ILCR[f]	Recreational Site-User HI[g]
METALS										
Aluminum	1.10E+04	1.63E+04	2.14E+04		NA	6.27E+05				
Antimony	6.50E-01	1.99E+00	2.64E+00		NA	2.47E+02				
Arsenic	4.60E+00	1.37E+01	2.54E+01		2.94E+01	1.89E+02				
Barium	8.25E+01	1.24E+02	1.94E+02		NA	4.41E+04				
Beryllium	8.16E-01	8.00E-01	8.68E-01	8.16E-01	NA	4.08E+02				
Calcium	5.02E+02	1.72E+03	3.55E+03		NA	NA				
Chromium	1.50E+01	3.70E+01	6.44E+01		NA	1.82E+03				
Cobalt	5.65E+00	1.52E+01	3.25E+01		NA	3.75E+04				
Copper	2.98E+01	1.27E+01	2.25E+01	2.98E+01	NA	2.52E+04				
Iron	2.51E+04	3.42E+04	5.54E+04		NA	1.89E+05				
Lead	1.01E+01	4.01E+01	6.38E+01		NA	4.00E+02				
Magnesium	4.89E+02	1.03E+03	9.60E+03		NA	NA				
Manganese	4.10E+02	1.58E+03	4.66E+03		NA	2.85E+04				
Mercury	4.50E-02	8.00E-02	3.22E-01		NA	1.84E+02				
Nickel	6.38E+00	1.03E+01	2.00E+01		NA	1.20E+04				
Potassium	1.63E+03	8.00E+02	6.01E+03	1.63E+03	NA	NA				
Selenium	1.27E+00	4.80E-01	1.28E+00	1.27E+00	NA	3.15E+03				
Silver	1.47E+00	3.60E-01	1.13E+00	1.47E+00	NA	3.16E+03				
Thallium	7.90E-01	3.43E+00	4.53E-01		NA	4.10E+01				
Vanadium	1.86E+01	5.88E+01	9.94E+01		NA	4.00E+03				
Zinc	2.26E+01	4.06E+01	7.37E+01		NA	1.88E+05				
Total ILCR, HI									--	--

All concentrations expressed as mg/kg.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
-- = No ILCR or HI calculated.
NA = Not Available
[a] MDC presented only if it exceeds BSC, or no BSC is available.
[b] Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to soil.
[c] Site-specific screening level based on noncancer hazard for recreational site user exposure to soil.
[d] MDC presented only if it exceeds SSSL-c.
[e] MDC presented only if it exceeds SSSL-n.
[f] Incremental lifetime cancer risk for recreational site user exposed to chemical in surface soil.
[g] Hazard index for noncancer effects for recreational site user exposed to chemical in surface soil.
[h] SSSL based on chromium VI.

Table 2

Preliminary Risk Evalution for the Resident Exposure to Surface Soil
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Resident Soil SSSL-c[b]	Resident Soil SSSL-n[c]	Resident Cancer COPC?[d]	Resident Noncancer COPC?[e]	Resident ILCR[f]	Resident HI[g]
METALS										
Aluminum	1.10E+04	1.63E+04	2.14E+04		NA	7.80E+03				
Antimony	6.50E-01	1.99E+00	2.64E+00		NA	3.11E+00				
Arsenic	4.60E+00	1.37E+01	2.54E+01		4.26E-01	2.34E+00				
Barium	8.25E+01	1.24E+02	1.94E+02		NA	5.47E+02				
Beryllium	8.16E-01	8.00E-01	8.68E-01	8.16E-01	NA	9.60E+00				
Calcium	5.02E+02	1.72E+03	3.55E+03		NA	NA				
Chromium[h]	1.50E+01	3.70E+01	6.44E+01		NA	2.32E+01				
Cobalt	5.65E+00	1.52E+01	3.25E+01		NA	4.68E+02				
Copper	2.98E+01	1.27E+01	2.25E+01	2.98E+01	NA	3.13E+02				
Iron	2.51E+04	3.42E+04	5.54E+04		NA	2.34E+03				
Lead	1.01E+01	4.01E+01	6.38E+01		NA	4.00E+02				
Magnesium	4.89E+02	1.03E+03	9.60E+03		NA	NA				
Manganese	4.10E+02	1.58E+03	4.66E+03		NA	3.63E+02				
Mercury	4.50E-02	8.00E-02	3.22E-01		NA	2.33E+00				
Nickel	6.38E+00	1.03E+01	2.00E+01		NA	1.54E+02				
Potassium	1.63E+03	8.00E+02	6.01E+03	1.63E+03	NA	NA				
Selenium	1.27E+00	4.80E-01	1.28E+00	1.27E+00	NA	3.91E+01				
Silver	1.47E+00	3.60E-01	1.13E+00	1.47E+00	NA	3.91E+01				
Thallium	7.90E-01	3.43E+00	4.53E-01		NA	5.08E-01				
Vanadium	1.86E+01	5.88E+01	9.94E+01		NA	5.31E+01				
Zinc	2.26E+01	4.06E+01	7.37E+01		NA	2.34E+03				
Total ILCR, HI									--	--

All concentrations expressed as mg/kg.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
-- = No ILCR or HI calculated.
NA = Not Available
[a] MDC presented only if it exceeds BSC, or no BSC is available.
[b] Site-specific screening level (SSSL) based on cancer risk for resident exposure to surface soil.
[c] Site-specific screening level based on noncancer hazard for resident exposure to surface soil.
[d] MDC presented only if it exceeds SSSL-c.
[e] MDC presented only if it exceeds SSSL-n.
[f] Incremental lifetime cancer risk for resident exposed to chemical in surface soil.
[g] Hazard index for noncancer effects for resident exposed to chemical in surface soil.
[h] SSSL based on chromium VI.

Table 3

Preliminary Risk Evaluation for Recreational Site User Exposure to Subsurface Soil
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Recreational Site-User Soil SSSL-c[b]	Recreational Site-User Soil SSSL-n[c]	Recreational Site-User Cancer COPC?[d]	Recreational Site-User Noncancer COPC?[e]	Recreational Site-User ILCR[f]	Recreational Site-User HI[g]
METALS										
Aluminum	1.04E+04	1.36E+04	1.66E+04		NA	6.27E+05				
Antimony	7.00E-01	1.31E+00	3.84E+00		NA	2.47E+02				
Arsenic	5.90E+00	1.83E+01	5.49E+01		2.94E+01	1.89E+02				
Barium	7.92E+01	2.34E+02	4.50E+03		NA	4.41E+04				
Beryllium	6.40E-01	8.60E-01	2.19E+00		NA	4.08E+02				
Calcium	7.27E+01	6.37E+02	1.45E+03		NA	3.43E+02				
Chromium[h]	1.55E+01	3.83E+01	5.34E+01		NA	NA				
Cobalt	1.47E+01	1.75E+01	5.47E+01		NA	3.75E+04				
Copper	2.65E+01	1.94E+01	3.42E+01	2.65E+01	NA	2.52E+04				
Iron	3.13E+04	4.48E+04	4.35E+04		NA	1.89E+05				
Lead	5.80E+00	3.85E+01	5.00E+02		NA	4.00E+02				
Magnesium	1.60E+02	7.66E+02	5.94E+03		NA	NA				
Manganese	2.60E+02	1.36E+03	3.79E+03		NA	2.85E+04				
Mercury	1.60E-02	7.00E-02	1.09E-01		NA	1.84E+02				
Nickel	4.60E+00	1.29E+01	2.78E+01		NA	1.20E+04				
Potassium	1.45E+03	7.11E+02	1.42E+03	1.45E+03	NA	NA				
Sodium	4.29E+01	7.02E+02	6.43E+02		NA	NA				
Vanadium	3.32E+01	6.49E+01	9.17E+01		NA	4.00E+03				
Zinc	2.16E+01	3.49E+01	8.50E+01		NA	1.88E+05				
Total ILCR, HI									--	--

All concentrations expressed as mg/kg.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
NA = Not Available
-- = No ILCR or HI calculated.
[a] MDC presented only if it exceeds BSC, or no BSC is available.
[b] Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to soil.
[c] Site-specific screening level based on noncancer hazard for recreational site user exposure to soil.
[d] MDC presented only if it exceeds SSSL-c.
[e] MDC presented only if it exceeds SSSL-n.
[f] Incremental lifetime cancer risk for recreational site user exposed to chemical in subsurface soil.
[g] Hazard index for noncancer effects for recreational site user exposed to chemical in subsurface soil.
[h] SSSL based on chromium VI.

Table 4

Preliminary Risk Evaluation for the Resident Exposure to Subsurface Soil
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Resident Soil SSSL-c[b]	Resident Soil SSSL-n[c]	Resident Cancer COPC?[d]	Resident Noncancer COPC?[e]	Resident ILCR[f]	Resident HI[g]
METALS										
Aluminum	1.04E+04	1.36E+04	1.66E+04		NA	7.80E+03				
Antimony	7.00E-01	1.31E+00	3.84E+00		NA	3.11E+00				
Arsenic	5.90E+00	1.83E+01	5.49E+01		4.26E-01	2.34E+00				
Barium	7.92E+01	2.34E+02	4.50E+03		NA	5.47E+02				
Beryllium	6.40E-01	8.60E-01	2.19E+00		NA	9.60E+00				
Calcium	7.27E+01	6.37E+02	1.45E+03		NA	NA				
Chromium[h]	1.55E+01	3.83E+01	5.34E+01		NA	2.32E+01				
Cobalt	1.47E+01	1.75E+01	5.47E+01		NA	4.68E+02				
Copper	2.65E+01	1.94E+01	3.42E+01	2.65E+01	NA	3.13E+02				
Iron	3.13E+04	4.48E+04	4.35E+04		NA	2.34E+03				
Lead	5.80E+00	3.85E+01	5.00E+02		NA	4.00E+02				
Magnesium	1.60E+02	7.66E+02	5.94E+03		NA	NA				
Manganese	2.60E+02	1.36E+03	3.79E+03		NA	3.63E+02				
Mercury	1.60E-02	7.00E-02	1.09E-01		NA	2.33E+00				
Nickel	4.60E+00	1.29E+01	2.78E+01		NA	1.54E+02				
Potassium	1.45E+03	7.11E+02	1.42E+03	1.45E+03	NA	NA				
Sodium	4.29E+01	7.02E+02	6.43E+02		NA	NA				
Vanadium	3.32E+01	6.49E+01	9.17E+01		NA	5.31E+01				
Zinc	2.16E+01	3.49E+01	8.50E+01		NA	2.34E+03				
Total ILCR, HI									--	--

All concentrations expressed as mg/kg.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
NA = Not Available
-- = No ILCR or HI calculated.

[a] MDC presented only if it exceeds BSC, or no BSC is available.

[b] Site-specific screening level (SSSL) based on cancer risk for resident exposure to soil.

[c] Site-specific screening level based on noncancer hazard for resident exposure to soil.

[d] MDC presented only if it exceeds SSSL-c.

[e] MDC presented only if it exceeds SSSL-n.

[f] Incremental lifetime cancer risk for resident exposed to chemical in subsurface soil.

[g] Hazard index for noncancer effects for resident exposed to chemical in subsurface soil.

[h] SSSL based on chromium VI.

Table 5

Preliminary Risk Evaluation for the Resident Exposure to Groundwater
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Resident GW SSSL-c[b]	Resident GW SSSL-n[c]	Resident Cancer COPC?[d]	Resident Noncancer COPC?[e]	Resident ILCR[f]	Resident HI[g]
METALS										
Aluminum	2.95E+00	2.34E+00	9.60E+00	2.95E+00	NA	1.56E+00		2.95E+00		1.89E-01
Barium	7.81E-02	1.27E-01	4.72E-01		NA	1.10E-01				
Beryllium	2.48E-03	1.25E-03	2.37E-03	2.48E-03	NA	3.13E-03				
Calcium	1.56E+01	5.65E+01	4.52E+02		NA	NA				
Chromium	1.03E-02			1.03E-02	NA	4.69E-03		1.03E-02		2.19E-01
Cobalt	4.56E-02	2.34E-02	2.52E-02	4.56E-02	NA	9.39E-02				
Copper	6.13E-03	2.55E-02	2.35E-01		NA	6.26E-02				
Iron	5.97E+00	7.04E+00	2.58E+01		NA	4.69E-01				
Magnesium	8.66E-01	2.13E+01	1.49E+02		NA	NA				
Manganese	1.36E+00	5.81E-01	4.13E+00	1.36E+00	NA	7.35E-02		1.36E+00		1.85E+00
Nickel	9.36E-03			9.36E-03	NA	3.13E-02				
Potassium	1.31E+01	7.20E+00	6.85E+01	1.31E+01	NA	NA				
Selenium	2.02E-03			2.02E-03	NA	7.82E-03				
Sodium	9.58E+00	1.48E+01	4.90E+01		NA	NA				
Vanadium	8.05E-03	1.70E-02	1.14E-02		NA	1.10E-02				
Zinc	9.16E-02	2.20E-01	1.52E+00		NA	4.69E-01				
EXPLOSIVES										
2-Nitrotoluene	3.90E-04			3.90E-04	NA	1.53E-02				
Total ILCR, HI									--	**2.26E+00**

All concentrations expressed as mg/L.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
-- = No ILCR or HI calculated.
NA = Not Available
[a] MDC presented only if it exceeds BSC, or no BSC is available.
[b] Site-specific screening level (SSSL) based on cancer risk for resident exposure to groundwater.
[c] Site-specific screening level based on noncancer hazard for resident exposure to groundwater.
[d] MDC presented only if it exceeds SSSL-c.
[e] MDC presented only if it exceeds SSSL-n.
[f] Incremental lifetime cancer risk for resident exposed to chemical in groundwater.
[g] Hazard index for noncancer effects for resident exposed to chemical in groundwater.

Table 6

Preliminary Risk Evaluation for Recreational Site User Exposure to Surface Water
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Recreational Site-User SW SSSL-c[b]	Recreational Site-User SW SSSL-n[c]	Recreational Site-User Cancer COPC?[d]	Recreational Site-User Noncancer COPC?[e]	Recreational Site-User ILCR[f]	Recreational Site-User HI[g]
METALS										
Barium	2.23E-02	7.54E-02	1.13E-01		NA	1.10E+00				
Calcium	8.44E-01	2.52E+01	6.41E+01		NA	NA				
Iron	6.98E-02	1.96E+01	4.12E+01		NA	4.70E+00				
Magnesium	5.95E-01	1.10E+01	2.44E+01		NA	NA				
Manganese	9.92E-03	5.65E-01	1.83E+00		NA	6.40E-01				
Selenium	2.01E-03	NA	NA	2.01E-03	NA	7.82E-02				
Sodium	1.06E+00	3.44E+00	1.52E+01		NA	NA				
Total ILCR, HI									--	--

All concentrations expressed as mg/L.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
-- = No ILCR or HI calculated.
NA = Not Available
[a] MDC presented only if it exceeds BSC, or no BSC is available.
[b] Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to surface water.
[c] Site-specific screening level based on noncancer hazard for recreational site user exposure to surface water.
[d] MDC presented only if it exceeds SSSL-c.
[e] MDC presented only if it exceeds SSSL-n.
[f] Incremental lifetime cancer risk for recreational site user exposed to chemical in surface water.
[g] Hazard index for noncancer effects for recreational site user exposed to chemical in surface water.

Table 7

Preliminary Risk Evaluation for Recreational Site-User Exposure to Sediment
Range 24 Lower, Parcel 81Q
Fort McClellan, Calhoun County, Alabama

Chemical	MDC	BSC	UTL	Site-Related Chemical?[a]	Recreational Site-User Sed SSSL-c[b]	Recreational Site-User Sed SSSL-n[c]	Recreational Site-User Cancer COPC?[d]	Recreational Site-User Noncancer COPC?[e]	Recreational Site-User ILCR[f]	Recreational Site-User HI[g]
METALS										
Aluminum	5.40E+03	8.59E+03	1.43E+04		NA	1.15E+06				
Arsenic	4.22E+00	1.13E+01	2.01E+01		5.58E+01	3.59E+02				
Barium	5.27E+01	9.89E+01	1.91E+02		NA	8.36E+04				
Beryllium	6.37E-01	9.70E-01	1.24E+00		NA	1.50E+02				
Calcium	1.90E+02	1.11E+03	2.81E+03		NA	NA				
Chromium[h]	8.36E+00	3.12E+01	6.33E+01		NA	2.79E+03				
Cobalt	8.30E+00	1.10E+01	2.19E+01		NA	6.72E+04				
Copper	5.35E+00	1.71E+01	3.68E+01		NA	4.74E+04				
Iron	2.14E+04	3.53E+04	5.19E+04		NA	3.59E+05				
Lead	5.63E+00	3.78E+01	7.64E+01		NA	4.00E+02				
Magnesium	4.62E+02	9.06E+02	2.20E+03		NA	NA				
Manganese	3.71E+02	7.12E+02	2.05E+03		NA	4.38E+04				
Nickel	5.17E+00	1.30E+01	3.16E+01		NA	1.76E+04				
Potassium	1.31E+03	1.01E+03	2.79E+03	1.31E+03	NA	NA				
Silver	1.06E+00	3.20E-01	1.05E+00	1.06E+00	NA	6.07E+03				
Vanadium	1.51E+01	4.09E+01	6.67E+01		NA	4.83E+03				
Zinc	1.23E+01	5.27E+01	1.11E+02		NA	3.44E+05				
Total ILCR, HI									--	--

All concentrations expressed as mg/kg.
MDC = maximum detected concentration; BSC = background screening criterion; UTL = 95% Upper Tolerance Limit.
-- = No ILCR or HI calculated.
NA = Not Available

[a] MDC presented only if it exceeds BSC, or no BSC is available.

[b] Site-specific screening level (SSSL) based on cancer risk for recreational site user exposure to sediment.

[c] Site-specific screening level based on noncancer hazard for recreational site user exposure to sediment.

[d] MDC presented only if it exceeds SSSL-c.

[e] MDC presented only if it exceeds SSSL-n.

[f] Incremental lifetime cancer risk for recreational site user exposed to chemical in sediment.

[g] Hazard index for noncancer effects for recreational site user exposed to chemical in sediment.

[h] SSSL based on chromium VI.